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Now $\log_e \pi = \log_e[1+(\pi-1)] = (\pi-1) - \frac{1}{2}(\pi-1)^2 + \frac{1}{3}(\pi-1)^3 - \frac{1}{4}(\pi-1)^4 + \ldots = A$, suppose.

$\therefore \pi^{nx} = 1 + Anx + (Anx)^2/2! + (Anx)^3/3! + (Anx)^4/4! + \ldots$

NOTE.—Frank Gilman, of Churchville, N. Y., sent in a solution of problem 129, which is based on Chauvenet's method. The method has the advantage of being more convenient in practice and lends itself more easily to logarithmic computation. We have not the space to publish the solution. Mr. Gilman gets as a result 57° 38' 17".

PROBLEMS FOR SOLUTION.

ARITHMETIC.

166. Proposed by F. P. MATZ, Sc. D., Ph. D., Professor of Mathematics and Astronomy in Defiance College, Defiance, Ohio.

A teacher's monthly salary after $m=2$ increases of $p=20$ and $q=10\%$, is $\$M=\$120$. What was the original salary?

ALGEBRA.

177. Proposed by F. P. MATZ, Sc. D., Ph. D., Professor of Mathematics and Astronomy in Defiance College, Defiance, Ohio.

Solve $m^{2x}(m^2+1) = (m^{3x}+m^x)m$.

GEOMETRY.

200. Proposed by W. J. GREENSTREET, M. A., Editor of The Mathematical Gazette, Stroud, England.

Find the locus of eight points of contact of the four common tangents of two concentric coaxial ellipses.

CALCULUS.

165. Proposed by CAPT. T. C. DICKSON, Ordnance Department United States Army, Washington.

Solve by integration, the differential equation

$$\frac{d^2\varphi}{dt^2} + \frac{A}{B}\left(\frac{d\varphi}{dt}\right)^2 - \frac{C}{B} = 0, \text{ in which:}$$

$A = 1{,}103{,}430{,}032.196\sin\varphi\cos\varphi - 38{,}579{,}566.1706\sin^2\varphi + 38{,}575{,}641.7961\cos^2\varphi - 310.6332\cos\varphi + 204.6506\sin\varphi + 17.6818M\cos\varphi\sin\varphi + .4082M\sin^2\varphi - .4117M\cos^2\varphi - .3117M\sin\varphi + .0061M\cos\varphi,$

$B = 6382.5395\sin\varphi\cos\varphi + 59{,}363.1172\sin^2\varphi - .0095M\sin^2\varphi - 204.65\cos\varphi - -310.6332\sin\varphi - .8199M\cos\varphi\sin\varphi - .0095M\sin^2\varphi - 17.6904M\cos^2\varphi + .0061M\sin\varphi + .3117M\cos\varphi - 1310.866,$